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35 U.S.C. 102 Conditions for patentability; novelty and loss of right to patent. - Patent Laws

35 U.S.C. 102 Conditions for patentability; novelty and loss of right to patent.

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in - (1) an application for patent, published under **section 122(b)**, by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in **section 351(a)** shall have the effects for the purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under **Article 21(2)** of such treaty in the English language; or

(f) he did not himself invent the subject matter sought to be patented, or

(g)(1) during the course of an interference conducted under **section 135** or **section 291**, another inventor involved therein establishes, to the extent permitted in **section 104**, that before such person's invention thereof the invention was made by

such other inventor and not abandoned, suppressed, or concealed, or (2) before such person's invention thereof, the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it. In determining priority of invention under this subsection, there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

(Amended July 28, 1972, Public Law 92-358, sec. 2, 86 Stat. 501; Nov. 14, 1975, Public Law 94-131, sec. 5, 89 Stat. 691.)

(Subsection (e) amended Nov. 29, 1999, Public Law 106-113, sec. 1000(a)(9), 113 Stat. 1501A-565 (S. 1948 sec. 4505).)

(Subsection (g) amended Nov. 29, 1999, Public Law 106-113, sec. 1000(a)(9), 113 Stat. 1501A-590 (S. 1948 sec. 4806).)

(Subsection (e) amended Nov. 2, 2002, Public Law 107-273, sec. 13205, 116 Stat. 1903.)

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**(WO/2004/008517) ORGANIC SILOXANE COPOLYMER FILM, METHOD AND DEPOSITION APPARATUS FOR PRODUCING SAME, AND SEMICONDUCTOR DEVICE USING SUCH COPOLYMER FILM**

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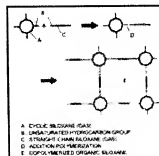
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Priority Data: 2002-205468 15.07.2002 JP

Title: (EN) ORGANIC SILOXANE COPOLYMER FILM, METHOD AND DEPOSITION APPARATUS FOR PRODUCING SAME, AND SEMICONDUCTOR DEVICE USING SUCH COPOLYMER FILM
 (JA) 有機シロキサン共重合体膜、その製造方法、及び成長装置、並びに該共重合体膜を用いた半導体装置

Abstract: (EN) An insulating organic polymer film suitable for an interlayer dielectric film, which separates a multilayer copper interconnect of a semiconductor device, having an excellent mechanical strength and adhesion at the interface with an inorganic dielectric film lying as a lower or upper layer and a low effective relative dielectric constant as the entire film. An organic siloxane copolymer film is produced by polymerizing a cyclic siloxane and a straight-chain siloxane, which are used as raw materials, by plasma excitation. The organic siloxane copolymer film has a film composition principally formed of the straight-chain siloxane component at the interface with an inorganic dielectric film, thereby constituting a dense interfacial layer having a film property of excellent adhesion. The organic siloxane copolymer film has therein a layer containing a cyclic siloxane component where voids surrounded by a cyclic siloxane skeleton are and present and a straight-chain siloxane component and has a network structure with a relatively reduced density. Accordingly, such a copolymer film has a composition changing in the direction of film thickness, and a multilayer interconnect is formed by embedding a copper film therein.



(JA) 半導体デバイスの多層銅配線を分離する層間絶縁膜に適する、下地あるいは上層の無機絶縁膜と接する界面においては、機械的強度と密着性に優れ、かつ膜全体としては、実効比誘電率の低い、絶縁性有機重合体膜を提供する。環状シロキサンと、直鎖状シロキサンとを原料とし、両者をプラズマ励起して重合させた有機シロキサン共重合体膜であり、無機絶縁膜と接する界面に、直鎖状シロキサン成分を主成分とする膜組成とすることで、緻密かつ密着性に優れた膜質の界面層を設け、膜内部に

は、環状シロキサン骨格に囲まれた空孔を内在する環状シロキサン成分と、直鎖状シロキサン成分とが混在し、相対的に密度を抑えた網目構造を有する層を有する、膜厚方向に組成変化を有する該共重合体膜に、銅薄膜を埋め込んだ多層配線を形成する。

Designated States: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
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